

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)
)
 Kanji OHYAMA) Confirmation No.: 1480
)
 Application No.: 10/584,082) Group Art Unit: Unassigned
)
 Filed: June 22, 2006) Examiner: Unassigned
)
 For: MARCHANTIALES-DERIVED UNSATURATED FATTY ACID SYNTHETASE GENES
 AND USE OF THE SAME

Commissioner for Patents
U.S. Patent and Trademark Office

Customer Window Mail Stop: ☐ New Application ☒ Amendment ☐ AF ☐ Issue Fee
Alexandria, VA 22314

Sir:

INFORMATION DISCLOSURE STATEMENT (IDS)

☒ **Under 37 C.F.R. § 1.97(b):** Pursuant to 37 C.F.R. §§ 1.56 and 1.97(b), Applicant brings to the attention of the Examiner the documents listed on the attached PTO Form 1449. To the undersigned's knowledge, this IDS is being filed before the mailing date of a first Office Action on the merits, before the mailing date of a first Office Action on the merits after filing an RCE under § 1.114, or within three months of the application filing date.

☐ **Under 37 C.F.R. § 1.97(c):** Pursuant to 37 C.F.R. §§ 1.56 and 1.97(c), Applicant brings to the attention of the Examiner the documents listed on the attached PTO Form 1449. This IDS is being filed after the events recited in § 1.97(b) but, to the undersigned's knowledge, before the mailing date of a Final Office Action, a Notice of Allowance, or another action that closes prosecution in the application.

☐ The fee of \$180.00 set forth in § 1.17(p) is included herein; or

☐ Applicant submits that each item of information contained in this IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this IDS.

☐ **Under 37 C.F.R. § 1.97(d):** Pursuant to 37 C.F.R. §§ 1.56 and 1.97(d), Applicant brings to the attention of the Examiner the documents listed on the attached PTO Form 1449. This IDS is being filed after the events recited in § 1.97(c) but before payment of the issue fee.

☐ The fee of \$180.00 set forth in § 1.17(p) is included herein; and

☐ Applicant submits that each item of information contained in this IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this IDS.

☐ **Under 37 C.F.R. § 1.97(i):** Pursuant to 37 C.F.R. §§ 1.56 and 1.97(i), Applicant brings to the attention of the Examiner the documents listed on the attached PTO Form 1449. This IDS is being filed after the events recited in § 1.97(d). Applicant requests that the IDS be placed in the file.

☐ A search report or other listing of documents from a counterpart, related, or other application dated _____ and having documents cited thereon is attached for the Examiner's consideration. Any of these documents not previously cited, and any additional documents are listed on the PTO Form 1449.

☒ Applicant respectfully requests that the Examiner consider the listed documents and evidence that consideration by making appropriate notations on the attached form. As for any document listed on the accompanying PTO-1449 that is in a language other than English, relevance can be understood from an enclosed English abstract or at least partial translation or from mention in the specification or in a search report for a corresponding application.

This submission does not represent that a search has been made or that no better art exists and does not constitute an admission that any of the listed documents are material or constitute "prior art." If it should be determined that any of the listed documents do not constitute "prior art" under United States law, Applicant reserve the right to present to the Office the relevant facts and law regarding the appropriate status of such documents.

Applicant further reserves the right to take appropriate action to establish the patentability of the disclosed invention over the listed documents, should any of the documents be applied against the claims of the present application.

Except for issue fees payable under 37 C.F.R. § 1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this Application, including fees due under 37 C.F.R. § 1.16 and 1.17 which may be required and including any required extension of time fees, or credit any overpayment to Deposit Account No. 50-0573. This paragraph is intended to be a CONSTRUCTIVE PETITION FOR EXTENSION OF TIME in accordance with 37 C.F.R. § 1.136(a)(3).

Respectfully submitted,

DRINKER, BIDDLE & REATH LLP

Dated: May 15, 2007


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INFORMATION DISCLOSURE CITATION (Use several sheets if necessary)				Attorney Docket No.: 47236-0009		Serial No.: 10/584,082	
PTO Form 1449				Applicant Kanji OHYAMA		Page 1 of 4	
				Filing Date: June 22, 2006		Group Art Unit: Unassigned	
U.S. PATENT DOCUMENTS							
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FOREIGN PATENT DOCUMENTS							
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OTHER DOCUMENTS							
(Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.)							
		Y. FUJINO, "Introduction to Lipid Analysis Method, Biochemical Experimental Method 9," Gakkai Shuppan Center, pp. 42-46, pp. 154-157, and its partial English-language translation.					
		A. YAMADA, "Experimental Method for Plant Lipid Metabolism, Biochemical Experimental Method 24," Gakkai Shuppan Center, pp. 2-9, and its partial English-language translation.					
		F. DOMERGUE et al., "Cloning and functional characterization of <i>Phaeodactylum tricornutum</i> front-end desaturases involved in eicosapentaenoic acid biosynthesis," Eur. J. Biochem., 2002, Vol. 269, pp. 4105-4113.					
		O. SAYANOVA et al., "Expression of a borage desaturase cDNA containing an N-terminal cytochrome <i>b₅</i> domain results in the accumulation of high levels of Δ^6 -desaturated fatty acids in transgenic tobacco," Proc. Natl. Acad. Sci. USA, April 1997, Vol. 94, pp. 4211-4216.					
		F. GARCÍA-MAROTO et al., "Cloning and Molecular Characterization of the Δ^6 -Desaturase from Two <i>Echium</i> Plant Species: Production of GLA by Heterologous Expression in Yeast and Tobacco," Lipids, 2002, Vol. 37, No. 4, pp. 417-426.					
		O. SAYANOVA et al., "Identification of <i>Primula</i> fatty acid Δ^6 -desaturases with <i>n</i> -3 substrate preferences," FEBS Letters, 2003, Vol. 542, pp. 100-104.					
		H. WHITNEY et al., "Functional characterisation of two cytochrome <i>b₅</i> -fusion desaturases from <i>Anemone leveillei</i> : the unexpected identification of a fatty acid Δ^6 -desaturase," Planta, July 24, 2003, Vol. 217, pp. 983-992.					
		Y. HUANG et al., "Cloning of Δ^{12} - and Δ^6 -Desaturases from <i>Mortierella alpina</i> and Recombinant Production of γ -Linolenic Acid in <i>Saccharomyces cerevisiae</i> ," Lipids, 1999, Vol. 34, No. 7, pp. 649-659.					
		E. SAKURADANI et al., " Δ^6 -Fatty acid desaturase from an arachidonic acid-producing <i>Mortierella</i> fungus Gene cloning and its heterologous expression in a fungus, <i>Aspergillus</i> ," Gene, August 6, 1999, Vol. 238, pp. 445-453.					
		J. NAPIER et al., "Identification of a <i>Caenorhabditis elegans</i> Δ^6 -fatty-acid-desaturase by heterologous expression in <i>Saccharomyces cerevisiae</i> ," Biochem. J., 1998, Vol. 330, pp. 611-614.					
		A. REDDY et al., "Isolation of a Δ^6 -desaturase gene from the cyanobacterium <i>Synechocystis</i> sp. Strain PCC 6803 by gain-of-function expression in <i>Anabaena</i> sp. Strain PCC 7120," Plant Molecular Biology, 1993, Vol. 27, pp. 293-300.					
Examiner					Date Considered		
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		T. AKI et al., "Molecular Cloning and Functional Characterization of Rat Δ -6 Fatty Acid Desaturase," Biochemical and Biophysical Research Communications, 1999, Vol. 255, No. 3, pp. 575-579.					
		H. CHO et al., "Cloning, Expression, and Nutritional Regulation of the Mammalian Δ -6 Desaturase," The Journal of Biological Chemistry, January 1, 1999, Vol. 274, No. 1, pp. 471-477.					
		J. PARKER-BARNES et al., "Identification and characterization of an enzyme involved in the elongation of n-6 and n-3 polyunsaturated fatty acids," PNAS, July 18, 2000, Vol. 97, No. 15, pp. 8284-8289.					
		F. BEAUDOIN et al., "Heterologous reconstitution in yeast of the polyunsaturated fatty acid biosynthetic pathway," PNAS, June 6, 2000, Vol. 97, No. 12, pp. 6421-6426.					
		T. ZANK et al., "Cloning and functional characterisation of an enzyme involved in the elongation of Δ 6-polyunsaturated fatty acids from the moss <i>Physcomitrella patens</i> ," The Plant Journal, 2002, Vol. 31, No. 3, pp. 255-268.					
		C. OH et al., " <i>ELO2</i> and <i>ELO3</i> , Homologues of the <i>Saccharomyces cerevisiae</i> <i>ELO1</i> Gene, Function in Fatty Acid Elongation and Are Required for Sphingolipid Formation," The Journal of Biological Chemistry, July 11, 1997, Vol. 272, No. 28, pp. 17376-17384.					
		D. JAMES, JR. et al., "Directed Tagging of the Arabidopsis <i>FATTY ACID ELONGATION1 (FAE1)</i> Gene with the Maize Transposon <i>Activator</i> ," The Plant Cell, March 1995, Vol. 7, pp. 309-319.					
		D. KNUTZON et al., "Identification of Δ 5-Desaturase from <i>Mortierella alpina</i> by Heterologous Expression in Bakers' Yeast and Canola," The Journal of Biological Chemistry, November 6, 1998, Vol. 273, No. 45, pp. 29360-29366.					
		L. MICHAELSON et al., "Functional identification of a fatty acid Δ^5 desaturase gene from <i>Caenorhabditis elegans</i> ," FEBS Letters, 1998, Vol. 439, pp. 215-218.					
		R. ZOLFAGHARI et al., "Fatty Acid Δ^5 -Desaturase mRNA is Regulated by Dietary Vitamin A and Exogenous Retinoic Acid in Liver of Adult Rats ¹ ," Archives of Biochemistry and Biophysics, July 1, 2001, Vol. 391, No. 1, pp. 8-15.					
		H. CHO et al., "Cloning, Expression, and Fatty Acid Regulation of the Human Δ -5 Desaturase," The Journal of Biological Chemistry, December 24, 1999, Vol. 274, No. 52, pp. 37335-37339.					
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		F. DOMERGUE et al., "Acyl Carriers Used as Substrates by the Desaturases and Elongases Involved in Very Long-chain Polyunsaturated Fatty Acids Biosynthesis Reconstituted in Yeast," The Journal of Biological Chemistry, September 12, 2003, Vol. 278, No. 37, pp. 35115-35126.					
		M. KAJIKAWA et al., "Functional Analysis of a β -Ketoacyl-CoA Synthase Gene, <i>MpFAE2</i> , by Gene Silencing in the Liverwort <i>Marchantia polymorpha</i> L.," Biosci. Biotechnol. Biochem., 2003, Vol. 67, No. 3, pp. 605-612.					
		M. KAJIKAWA et al., " <i>MpFAE3</i> , a β -Ketoacyl-CoA Synthase Gene in the Liverwort <i>Marchantia polymorpha</i> L., is Preferentially Involved in Elongation of Palmitic Acid to Stearic Acid," Biosci. Biotechnol. Biochem., 2003, Vol. 67, No. 8, pp. 1667-1674.					
		V. DEMBITSKY, "Lipids of Bryophytes," Prog. Lipid Res., 1993, Vol. 32, No. 3, pp. 281-356.					
		T. HASHIMOTO-GOTOH et al., "An oligodeoxyribonucleotide-directed dual amber method for site-directed mutagenesis," Gene, 1995, Vol. 152, pp. 271-275.					
		L. ZHANG et al., "Gene Expression Profiles in Normal and Cancer Cells," Science, May 23, 1997, Vol. 276, pp. 1268-1272.					
		V. VELCULESCU et al., "Characterization of the Yeast Transcriptome," Cell, January 24, 1997, Vol. 88, pp. 243-251.					
		V. VELCULESCU et al., "Serial Analysis of Gene Expression," Science, October 20, 1995, Vol. 270, pp. 484-487.					
		K. POLYAK et al., "A model for p53-induced apoptosis," Nature, September 18, 1997, Vol. 389, pp. 300-305.					
		M. FUJISAWA et al., "Isolation of X and Y Chromosome-Specific DNA Markers from a Liverwort, <i>Marchantia polymorpha</i> , by Representational Difference Analysis," Genetics, November 2001, Vol. 159, pp. 981-985.					
		I. MITSUHARA et al., "Efficient Promoter Cassettes for Enhanced Expression of Foreign Genes in Dicotyledonous and Monocotyledonous Plants," Plant Cell Physiol., 1996, Vol. 37, No. 1, pp. 49-59.					
		F. VAN ENGELLEN et al., "pBINPLUS: an improved plant transformation vector based on pBIN19," Transgenic Research, 1995, Vol. 4, pp. 288-290.					
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Document Number	Date	Country	Class	Sub Class	<u>Translation</u> YES NO

OTHER DOCUMENTS

(Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.)

	Y. TANAKA et al., "Molecular Cloning and Characterization of <i>Rosa hybrida</i> Dihydroflavonol 4-reductase Gene," Plant Cell Physiol., 1995, Vol. 36, No. 6, pp. 1023-1031.
	F. BRUGLIERA et al., "Isolation and characterization of a cDNA clone corresponding to the <i>Rt</i> locus of <i>Petunia hybrida</i> ," The Plant Journal, 1994, Vol. 5, No. 1, pp. 81-92.
	G. LAZO et al., "A DNA Transformation-Competent <i>Arabidopsis</i> Genomic Library in <i>Agrobacterium</i> ," Bio/Technology, October 1991, Vol. 9, pp. 963-967.
	A. ABBADI et al., "Biosynthesis of Very-Long-Chain Polyunsaturated Fatty Acids in Transgenic Oilseeds: Constraints on Their Accumulation," The Plant Cell, October 2004, Vol. 16, pp. 2734-2748.
	B. QI et al., "Production of very long chain polyunsaturated omega-3 and omega-6 fatty acids in plants," Nature Biotechnology, June 2004, Vol. 22, No. 6, pp. 739-745.
	Search Report issued on December 4, 2005 in International PCT Application PCT/JP2004/019196 (previously submitted to Office on June 22, 2006)

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